

● PRINTER RUSH ●

(PTO ASSISTANCE)

Application: 02/997027 Examiner: Orincy, IT GAU: 2646

From: EF

Location: (IDC) FMF FDC

Date: 11-2-05

Tracking #: FPM-

Week Date: 8-22-05

02/997027

| DOC CODE | DOC DATE | MISCELLANEOUS |
|--|-----------------|--|
| <input type="checkbox"/> 1449 | | <input type="checkbox"/> Continuing Data |
| <input type="checkbox"/> IDS | | <input type="checkbox"/> Foreign Priority |
| <input checked="" type="checkbox"/> CLM | | <input type="checkbox"/> Document Legibility |
| <input type="checkbox"/> IIFW | | <input type="checkbox"/> Fees |
| <input type="checkbox"/> SRFW | | <input type="checkbox"/> Other |
| <input type="checkbox"/> DRW | | |
| <input type="checkbox"/> OATH | | |
| <input type="checkbox"/> 312 | | |
| <input checked="" type="checkbox"/> SPEC | <u>11-30-01</u> | |

[RUSH] MESSAGE: 1. ON PAGE 7 LINE 6, THERE IS A MISSING SERIAL NUMBER. PLEASE PROVIDE.

2. Amendment for claims 12 & 13 amended incorrectly.

THANK YOU

[XRUSH] RESPONSE:


① Missing information supplied. SPEC corrected.

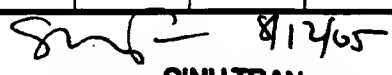
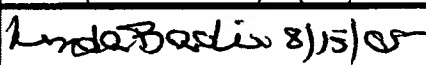
② Your message is too vague. Evidently, you meant to say that the dependencies of original claims 12 and 13 were improper. IIFW updated.

INITIALS: DGO

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

REV 10/04

| | | | |
|--|-------------------------|---|--|
| Issue Classification  | Application/Control No. | Applicant(s)/Patent under Reexamination | |
| | 09/997,527 | MELSA, PETER J. | |
| | Examiner | Art Unit | |
| | Walter F. Briney III | 2646 | |

| ISSUE CLASSIFICATION | | | | | | | | | |
|--|----------|---|---|------|---|-----------------------------------|--|--|--|
| ORIGINAL | | | | | CROSS REFERENCE(S) | | | | |
| CLASS | SUBCLASS | | | | CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | |
| 379 | 399.01 | | | | 330 | 297 | | | |
| INTERNATIONAL CLASSIFICATION | | | | | | | | | |
| H | 0 | 3 | F | 3/04 | | | | | |
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| Walter F Briney III 08/11/2005 (Assistant Examiner) (Date) | | | | |  SINH TRAN SUPERVISORY PATENT EXAMINER (Primary Examiner) (Date) | | | | |
|  (Legal Instruments Examiner) (Date) | | | | | Total Claims Allowed: 24 O.G. Print Claim(s) 1 O.G. Print Fig. 3 | | | | |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant | | <input type="checkbox"/> CPA | | <input type="checkbox"/> T.D. | | <input type="checkbox"/> R.1.47 | |
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| Final | Original | Final | Original | Final | Original | Final | Original |
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DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Details regarding a preferred embodiment "zero-overhead" Class G

amplifier ("zero-overhead line driver") are provided in a related application titled

5 "Zero-Overhead Class G ^{Amplifier} ~~Line Driver~~ with Threshold Detection", attorney docket
number TI-33141, serial number 10/001,330 and filed on ^{October 31} ~~November 11~~, 2001, ^{now U.S. 6,614,310,}

which is hereby incorporated by reference in its entirety. By "zero overhead," it is

mean that the amount of pad or tolerance that must be built into the threshold

value (in order to ensure the incoming signal is not clipped and that the line driver

10 does not consume excess power) is minimized by setting the threshold as closely

as possible to the theoretical threshold (disregarding measurement inaccuracies,

filter distortion, and the like). A zero overhead Class G line driver makes the

threshold determination on the incoming signal while the signal is still in the

digital domain, thus improving the accuracy of the determination. Additionally,

15 rather than switch between a first or second sub-amplifier, the preferred

embodiment zero overhead line driver employs a single output amplifier with

multiple power supplies of distinct voltages. The zero-overhead line driver also

employs a peak detector circuit to determine which of the power supplies are to

be connected to the supply rail of the output amplifier, and then dynamically

20 switches the output amplifier from one power supply to another power supply.

This determination is generally based upon the amplitude of the input data signal:

i.e., if the input data signal is above or below a given threshold. The selected

power supply is then applied to the supply rail of the amplifier.



US006614310B2

(12) **United States Patent**
Quarfoot et al.

(10) **Patent No.: US 6,614,310 B2**
(45) **Date of Patent: Sep. 2, 2003**

(54) **ZERO-OVERHEAD CLASS G AMPLIFIER
WITH THRESHOLD DETECTION**

(75) Inventors: **James Donald Quarfoot**, Richardson, TX (US); **Marco Corsi**, Parker, TX (US); **Richard Knight Hester**, McKinney, TX (US); **Kenneth George Maclean**, Dallas, TX (US)

(73) Assignee: **Texas Instruments Incorporated**, Dallas, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/001,330**

(22) Filed: **Oct. 31, 2001**

(65) **Prior Publication Data**

US 2003/0080816 A1 May 1, 2003

(51) Int. Cl.⁷ **H03G 3/20**

(52) U.S. Cl. **330/297; 330/136**

(58) Field of Search **330/10, 51, 127, 330/136, 297**

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,028,486 A * 2/2000 Andre 330/297

* cited by examiner

Primary Examiner—Steven J. Mottola

(74) *Attorney, Agent, or Firm*—W. Daniel Swayze, Jr.; W. James Brady; Frederic J. Telecky, Jr.

(57) **ABSTRACT**

The present invention provides an apparatus and method for operating driver amplifier (20) of a line driver circuit (10) from a lower set of power supply voltages, and from a higher set of voltages only when the amplitude of the signal (12) being transmitted by the line driver (20) requires it as determined by a comparator (18). Advantageously, this reduces the power dissipation in the line driver (10) by operating the line amplifier (20) the majority of the time from the lower supply voltage. A delay circuit (14) delays the signal to be amplified sufficient to allow the transition of the power supply voltages provided to the amplifier hysteresis of this power supply voltage switching may also be used to further reduce power dissipation.

20 Claims, 1 Drawing Sheet

